

ABSTRACT OF THE DISCLOSURE

A fuel reforming apparatus includes a vaporizing device, a vapor mixing device and a reforming device. The vaporizing device produces a vapor by vaporizing at least a portion of a first one of a hydrocarbon fuel and water, without mixing with a second one of the hydrocarbon fuel and the water, so as to produce a vapor gas containing the vapor and air. The vapor mixing device receives the vapor gas from the vaporizing device, and creates a vapor mixture by spraying at least a portion of at least one of the hydrocarbon fuel and the water, which was not vaporized by the vaporizing device, toward the supplied vapor gas. The reforming device receives the vapor mixture from the vapor mixing device and reforms the hydrocarbon fuel to a reformate gas containing hydrogen. The temperature of the vapor gas supplied to the vapor mixing device can be adjusted such that the temperature of the reformate source gas supplied to the reforming device falls within a temperature range corresponding to an operating temperature of the reforming device. Vapor mixing the fuel immediately prior to supplying it to the reforming device enables a pre-reaction of the reformate source gas to be inhibited.

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